PALEOECOLOGY

Project title: Evolution and Ecology of Vertebrates of Yellowstone National Park—Continuation of Lamar Cave and Waterfall Locality Paleoecology Research

Principal investigator: Dr. Elizabeth Hadly
Phone: 650-725-2655
Email: hadly@stanford.edu
Address: Department of Biological Sciences
Gilbert Building
Stanford University
Stanford, CA 94305-5020

Objective: Our objective was to determine whether we could map the origin of faunal and floral material through the past 3,000 years using strontium isotopic analyses.

Findings: One of the greatest challenges in using faunal assemblages to make ecological or paleoecological interpretations is determining the spatial scale over which such analyses are applicable. As a result, it has been difficult to use these assemblages to test hypotheses about spatial and temporal variability in populations. Here we show that it is possible to use strontium (Sr) isotopes from bones and vegetation to statistically constrain the area sampled in two Holocene predator accumulations in northeastern Yellowstone National Park, Wyoming. The sites have been used to elucidate local population responses to climatic change, based on the assumption that the specimens originated within ~5 km of the site. We used Sr analyses to construct a likelihood curve that describes the probability that our samples were collected within a given radius of each site. Our results indicate that the specimens in both sites were derived from non-overlapping populations and that the collection radius has not changed detectibly over the past 3,000 years. This work underscores the promise of this technique for ascribing source areas to paleontological, biological and ecological specimens.